Claims

1. A family of airfoils for a blade of a cooling-tower fan, wherein the blade has a root region and a tip region, the family of airfoils comprising an airfoil in the root region of the blade having a Reynolds number of 500,000, and an airfoil in the tip region of the blade having a Reynolds number of 1,000,000, and wherein each airfoil is characterized by a maximum lift coefficient that is largely insensitive to roughness effects.

2. The family of airfoils of claim 1 wherein the airfoil in the tip region has a maximum lift coefficient of 1.5, and the airfoil in the root region has a maximum lift coefficient of 1.5.

3. The family of airfoils of claim 2 wherein the blade is from 3 to 10 meters in length.

4. The family of airfoils of claim 2 wherein the tip-region airfoil has a thickness of about 10% chord, and the root region airfoil has a thickness of about 14% chord.

5. An airfoil for a blade of a cooling-tower fan wherein the blade has a root region airfoil having a cross-sectional shape characterized by a thickness of about 14% chord and a maximum lift coefficient of about 1.5 to be substantially insensitive to roughness, and a Reynolds number of 500,000.

6. The root region airfoil of claim 5 wherein the blade is 3 to 10 meters in length.

7. An airfoil for a blade of a cooling-tower fan wherein the blade has a root region airfoil comprises an upper surface and a lower surface and a blade chord line wherein x/c values are dimensionless locations along the blade chord line and the y/c values are dimensionless heights from the chord line to points on the upper or lower surface, wherein said values correspond substantially to the following table for said surfaces:

UPPER SURFACE

x/c	y/c
1.00000	0.00000
0.99662	0.00114
0.98703	0.00476
0.97233	0.01078
0.95346	0.01852
0.93085	0.02701
0.90436	0.03546
0.87375	0.04370
0.83919	0.05188
0.80116	0.05998
0.76012	0.06785
0.71657	0.07535

	0.67101	0.08232
	0.62395	0.08859
	0.57590	0.09397
	0.52735	0.09831
5	0.47876	0.10147
	0.43059	0.10333
	0.38330	0.10381
	0.33728	0.10284
	0.29293	0.10039
10	0.25059	0.09648
	0.21061	0.09119
	0.17330	0.08462
	0.13897	0.07691
	0.10792	0.06822
15	0.08040	0.05875
	0.05665	0.04869
	0.03685	0.03828
	0.02116	0.02780
	0.00968	0.01758
20	0.00256	0.00808
	0.00019	0.00179

LOWER SURFACE

	x/c	y/c
25	0.00000	-0.00004
	0.00021	-0.00165
	0.00093	-0.00316
	0.00215	-0.00470
	0.00374	-0.00627
30	0.01354	-0.01266
	0.02846	-0.01889
	0.04821	-0.02465
	0.07252	-0.02979
	0.10113	-0.03414
35	0.13371	-0.03759
	0.16991	-0.04003
	0.20931	-0.04131
	0.25153	-0.04120
	0.29632	-0.03951
40	0.34354	-0.03619
	0.39294	-0.03140
	0.44418	-0.02524
	0.49710	-0.01784
	0.55160	-0.00978
45	0.60714	-0.00186
	0.66285	0.00525
	0.71775	0.01102

0.77079	0.01508
0.82084	0.01719
0.86679	0.01718
0.90735	0.01506
0.94113	0.01136
0.96729	0.00713
0.98565	0.00340
0.99645	0.00088
1.00000	0.00000

8. An airfoil for a blade of a cooling-tower fan wherein the blade has a tip region airfoil having a cross-sectional shape characterized by a thickness of about 10% chord and a maximum lift coefficient of about 1.5 to be substantially insensitive to roughness, and an Reynolds number of 1,000,000.

9. The tip region airfoil of claim 5 wherein the blade is 3 to 10 meters in length.

10. An airfoil for a blade of a cooling-tower fan wherein the blade has a tip region airfoil comprises an upper surface and a lower surface and a blade chord line wherein x/c values are dimensionless locations along the blade chord line and the y/c values are dimensionless heights from the chord line to points on the upper or lower surface, wherein said values correspond substantially to the following table for said surfaces:

UPPER SURFACE

x/c	y/c
1.00000	0.00000
0.99670	0.00088
0.98716	0.00373
0.97222	0.00863
0.95269	0.01521
0.92905	0.02278
0.90137	0.03076
0.86962	0.03901
0.83410	0.04761
0.79539	0.05651
0.75405	0.06552
0.71067	0.07440
0.66582	0.08287
0.62009	0.09058
0.57397	0.09708
0.52766	0.10192
0.48128	0.10496
0.43504	0.10625
0.38928	0.10586
0.34435	0.10391
0.30064	0.10051

0.25854	0.09581
0.21849	0.08997
0.18089	0.08313
0.14614	0.07541
0.11457	0.06695
0.08648	0.05789
0.06211	0.04839
0.04163	0.03863
0.02516	0.02886
0.01280	0.01937
0.00455	0.01054
0.00047	0.00297
0.00003	0.00066

LOWER SURFACE

x/c	y/c
0.00004	-0.00070
0.00037	-0.00179
0.00120	-0.00266
0.00254	-0.00346
0.00771	-0.00536
0.02065	-0.00762
0.03926	-0.00898
0.06332	-0.00945
0.09261	-0.00909
0.12682	-0.00800
0.16562	-0.00627
0.20860	-0.00402
0.25530	-0.00138
0.30519	0.00152
0.35772	0.00455
0.41227	0.00755
0.46821	0.01041
0.52486	0.01296
0.58152	0.01510
0.63745	0.01667
0.69190	0.01759
0.74412	0.01779
0.79336	0.01725
0.83888	0.01593
0.87997	0.01390
0.91590	0.01120
0.94594	0.00809
0.96955	0.00501
0.98647	0.00240
0.99662	0.00063
1.00000	0.00000